

Petroleum and Natural Gas Systems
Covered Product Data Reporting and Verification Guidance
for California's Mandatory Greenhouse Gas Reporting Regulation

Introduction

This document provides guidance on the reporting and verification of covered product data for the petroleum and natural gas systems sector, as specified by the Regulation for the Mandatory Reporting of Greenhouse Gas (GHG) Emissions (title 17, California Code of Regulations, sections 95100 *et seq.*) (MRR). This guidance focuses on the requirements related to the reporting of covered product data¹ for onshore petroleum and natural gas production, natural gas processing, and natural gas liquid fractionating, with emphasis on reporting requirements that were added to MRR as of January 1, 2015.

This guidance complements existing petroleum and natural gas systems guidance documents, which can be found on the [Mandatory GHG Reporting Guidance Documents website](#), as well as the [Reporting and Verification Guidance for Natural Gas Fractionators](#). For additional information about covered product data reporting, including the requirement to exclude inaccurate covered product data, the use of financial transaction records, how covered product data are evaluated during verification for accuracy and conformance with the regulation, and other topics, view the [General Covered Product Data Reporting Guidance](#) document.

This guidance document describes the requirements of MRR. This guidance document does not, and cannot, create or vary any legal requirements of MRR.

Summary of MRR Changes

In the amendments to MRR that became effective January 1, 2015, sections 95102(a) and 95156 were updated to support allowance allocation for the Cap-and-Trade Program, including the following covered product data reporting requirements:

- 1) Section 95156 now specifies that either sales records or sales records with an inventory adjustment are deemed acceptable for covered product data reported pursuant to 95156(a)(7) - (10), (b), (c), and (d).
- 2) Section 95102(a) now includes a definition for sub-facility and provides additional clarity regarding the requirement to disaggregate facility data at the sub-facility level.
- 3) Sections 95156(a)(7) and (8) specify that the volume of crude oil reported as covered product data must be produced within the facility boundary during the data year, and may include the volume of crude oil fraction piped in as an emulsion as defined in section 95102(a).
- 4) Sections 95156(a)(9) and (10) now describe allowed methods and associated requirements for quantifying the heat energy of produced associated gas.
- 5) Section 95156(b) now specifies allowed methods and associated

¹ "Covered product data" means all product data included in the allocation of allowances under sections 95870, 95890, and 95891 of the Cap-and-Trade Regulation, regardless of whether the Cap-and-Trade Regulation imposes a compliance obligation for the data year.

- requirements for quantifying the heat energy of dry gas produced at onshore oil and gas production facilities.
- 6) Section 95156(c)(12) now specifies the requirements for reporting natural gas liquids (NGL) that are re-injected into crude oil produced at the same facility. These NGLs should be reported pursuant to 95156(a)(7) or (8), not 95156(c). All other NGLs produced at the facility should be reported pursuant to 95156(c).
 - 7) Section 95156(d) now specifies allowed methods and associated requirements for quantifying the heat energy of associated gas, waste gas, and natural gas processed at natural gas processing facilities with annual average throughput of 25 MMscf per day or greater.

1 Covered Product Data Reporting Methodology

Section 95103(l) requires reporting entities to exclude inaccurate covered product data and allows reporters to elect to exclude accurate covered product data. The quantification method(s) must meet the criteria in section 95103(k). All covered product data reported under section 95156 may be reported using one of two methodologies:

- 1) Lease Automatic Custody Transfer (LACT) Meters or other financial transaction data: Crude oil covered product data may be tracked and reported to MRR from sales records referenced to LACT meters or other financial transaction data. LACT meters or other financial transaction data are source data that do not need to meet the calibration requirements of MRR section 95103(k), as long as they meet the criteria for financial transaction meters in section 95103(k)(7). If LACT meter data or other financial transaction data (sales data) are used for covered product data reporting for MRR, the facility can consider the sales volume as the "produced" amount. Under this method, starting and ending inventory volumes in tanks and pipes (upstream from the LACT meters) should be excluded from covered product data reporting. This is a different approach than that which is used for California Division of Oil, Gas and Geothermal Resources (DOGGR) reporting.

The same principles apply for NGL covered product data. Financial transaction meters or records used to report covered product data are considered to meet the accuracy requirements in section 95103(k) if they meet the criteria for financial transaction meters in section 95103(k)(7).

- 2) Inventory Approach: Crude oil covered product data may also be reported as an aggregate of LACT meter or other financial transaction data plus end-of-data-year inventory volumes in tanks (upstream from the LACT meters) minus beginning-of-data-year inventory volumes in tanks (upstream from LACT meters). In this case, inventory amounts should be included in the covered product data reporting. If using inventory methods, the inventory amounts must be verified as accurate to +/-5 percent pursuant to section 95103(k)(11). As discussed directly above, the amounts reported using LACT meters are considered to meet the accuracy requirements in section 95103(k).

The same principles apply for NGL covered product data. If inventory amounts are reported, they must be verified as accurate to +/-5 percent pursuant to section 95103(k)(11). Amounts reported using financial transaction meters or records are considered to meet the accuracy requirements in 95103(k) if they meet the criteria for financial transaction meters in section 95103(k)(7).

For either approach, the GHG Monitoring Plan must explicitly describe the accounting methods used to track this data for the facility. In addition, the permanent method selected for quantifying covered product data cannot be changed without ARB approval, pursuant to the requirements in section 95103(m) of MRR.

The facility GHG Monitoring Plan must also include specific information on the methods used to quantify the covered product data reported under MRR. This should include information on how the operator assures that all covered product data are tracked, reported, and are accurate to within +/-5 percent. ARB staff recommends that the GHG Monitoring Plan include both a description and a schematic diagram of covered product data flows from individual wells or other processing points to intermediate collection points, separators, and other treatment units (e.g., dehydrators), storage tanks, LACT meters, and other metering systems, if used. Verifiers should request this information from the reporter if it is not clear in the GHG Monitoring Plan.

In addition, in the case that production amounts for a facility have increased or decreased greater than 5 percent from the previous data year, ARB staff recommends that the GHG Monitoring Plan include a detailed description as to why the production changes occurred. The description may include information on newly acquired or sold leases, information on cyclic steam stimulation practices and/or "soak" periods, or other relevant information to describe significant variations in production from year to year.

Oil and gas production facilities are required to report disaggregated product data, including covered product data, at the level of individual wells for crude oil, associated gas, produced water, and dry gas to DOGGR. ARB recommends that the facility GHG Monitoring Plan describe the process that the facility uses to disaggregate data to individual wells for DOGGR reporting, and how this differs from MRR reporting. DOGGR data that are available online may be used by verifiers as a cross check to evaluate MRR product data reporting, but cannot be expected to match MRR data exactly because the methods used to comply with MRR reporting differ from DOGGR reporting. Any cross-check between MRR and DOGGR will be qualitative in nature, but may be useful in revealing reporting errors or incomplete reporting.

2 Covered Product Data Reporting Process

Section 95156(a) of MRR specifies that emissions and product data, including covered product data, must be disaggregated within the basin reporting footprint to the sub-facility level when reported via the California Electronic Greenhouse Gas Reporting Tool (Cal e-GGRT). Sub-facility is defined in terms of single townships or a group of contiguous or adjacent townships, as identified in the Public Land Survey System of the United States. Sub-facilities may be further disaggregated according to similar operational, geological, or geographical characteristics. Reporters should refer to the definition of sub-facility found in section 95102(a) of MRR for additional information.

Entities that have already been reporting emissions and product data, including covered product data, at the sub-facility level should continue reporting with the same subdivision of information; however the facility's GHG Monitoring Plan must provide a map or a list identifying the townships, ranges, and section numbers that comprise the geographic boundaries of the sub-facilities. Production data must be further disaggregated between thermal and other-than-thermal (i.e., non-thermal) production processes at the sub-facility level. In the petroleum and natural gas systems sector, the term "facility" refers to the definitions in section 95102(a) of MRR, which generally define a facility as all GHG emissions sources located within a single geologic basin, as defined in 40CFR Section 98.238, under common ownership or common control.

The instructions in this guidance document pertain *only* to the covered product data portions within the Subpart W spreadsheet that is uploaded to Cal e-GGRT.

2.1 Onshore Petroleum and Natural Gas Production

The Cal e-GGRT reporting fields for section 95156 of MRR are shown in Figure 1.

Onshore Petroleum and Natural Gas Production																	
	A	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM	EN	
1	Onshore Petroleum and																
2																	
3	TO ADD ROW(s) TO THE TABLE, click the Add Row(s) button.																
4	TO DELETE EXTRANEOUS ROWS, click the Delete Rows button.																
5	NOTE: You will need to enable macros to use the table.																
6																	
7			Covered Product Data														
8	Contiguous Property/Sub-Facility Name:	Total CO ₂ e for Electricity not consumed (MT CO ₂ e)	Barrels of crude oil produced using thermal enhanced oil recovery (covered product data)	Barrels of crude oil produced using methods other than thermal enhanced oil recovery (covered product data)	MMBtu of associated gas produced using thermal enhanced oil recovery (covered product data)	MMBtu of associated gas produced using methods other than thermal enhanced oil recovery (covered product data)	MMBtu of dry gas produced (covered product data)	(95156(d)) MMBtu associated gas, natural gas, and waste gases processed (covered product data)*									
9	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0									
10		0.0															
11																	
12																	
13																	
14																	
15																	

* Note: An onshore natural gas processing facility that has an annual average throughput of 25 MMscf per day or greater must use this Onshore Production tab to report Natural Gas Processing covered product data, as applicable (95156(d)). Applicable NGL product data must also be reported in the NGL tab (95156(c)).

Instructions

Offshore production

Onshore production

Onshore processing

Onshore trans com

Underground storage

NGL

LNG storage

LNG import export

Figure 1. Sections 95156(a)-(b) and (d) Cal e-GGRT covered product reporting fields.

Reporters must enter a calculated emissions factor (EF) for onshore petroleum and natural gas production facilities with cogeneration, steam generators, and electricity generation sources (see Figure 2). Reporters should calculate this EF by dividing total CO₂e emissions by million British thermal units (MMBtu) input.

Reporting Associated Gas Produced

Sections 95156(a)(9) and (10) describe the methods and requirements for quantifying the heat energy of produced associated gas. Associated gas produced, using both thermal and other-than-thermal enhanced oil recovery production processes, may be estimated using records from production or sales meters, as appropriate, or by using GOR (gas-oil-ratio) and GWR (gas-water-ratio) information from a flash liberation test. In the latter case, using the most disaggregated data available (e.g., field or tank farm level), operators shall multiply the barrels of crude oil produced during the data year by a representative GOR measurement and also multiply the annual produced water

volume by a representative GWR measurement, and sum the results to arrive at the volume of associated gas produced. The average high heating value (HHV) of the produced associated gas is then multiplied by the total associated gas volume for the data year to determine the heat energy (in MMBtu). Reporters must collect and average HHV measurements with the frequency requirements in section 95153(y)(2)(D).

The following additional considerations are necessary for applying the LACT meter, GOR, GWR, and produced water volume to the quantification of produced associated gas:

1. The GOR and GWR must be representative of the LACT meter and produced water volume, respectively. For example, if five GOR values are representative for oil flowing through a single LACT meter, the facility must take a weighted average of each GOR before applying it to the LACT meter results.
2. GOR data from a single field cannot be applied to multiple fields with different LACT meters. For example, if a facility consists of two fields within a basin, A and B (with LACT meter and single produced water volume for each field), but only has one GOR sample from field A, the GOR sample from field A cannot be applied to field B.

Reporting Dry Gas Produced

Pursuant to section 95156(b), operators must report the annual heat energy of dry gas produced in MMBtu. The HHV of produced dry gas must be multiplied by the total dry gas volume for the data year to determine the heat energy in MMBtu. Reporters must collect and average HHV measurements with the frequency requirements in section 95153(y)(2)(D).

Onshore Petroleum and Natural Gas Production												
A	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW
1 Onshore Petroleum and												
2												
3 TO ADD ROW(s) TO THE TABLE, click the Add Row(s) button.												
4 TO DELETE EXTRANEOUS ROWS, click the Delete Row(s) button.												
5 NOTE: You will need to enable macros to use this table.												
6												
7	Steam Generator Sources					Steam Used (not Generated at Facility)				Electricity Generation		
8 Contiguous Property/Sub-Facility Name:	Total thermal energy generated (MMBtu)	Emission factor (MT CO ₂ e/MMBtu)	Total CO ₂ e for total thermal energy generated (MT CO ₂ e)	Thermal energy not consumed (MMBtu)	Emission factor (MT CO ₂ e/MMBtu)	Total CO ₂ e for thermal energy not consumed (MT CO ₂ e)	Total Steam Used but not Generated (MMBtu)	Emission factor (MT CO ₂ e/MMBtu)	Total CO ₂ e for total steam used but not generated (MT CO ₂ e)	Net Electricity Generation (MWh)	Emission factor (MT CO ₂ e/MWh)	Total CO ₂ e for Net Electricity Generation
9 Total	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
10												
11												
12												
13												
14												
15												

Figure 2. Steam and Electricity Generation Cal e-GGRT reporting fields.

The emissions and product data reporting requirements for onshore petroleum and natural gas production, along with the data verification requirements, are summarized in Table 1.

Table 1: Data reporting and verification requirements for onshore petroleum and natural gas production.

Reporting Requirement	Regulatory Section	Verification Requirement
Barrels of crude – thermal EOR	95156(a)(7)	The sum of (total) barrels of oil equivalent is assessed for material misstatement (section 95131(b)(12)). Each measurement of individual covered products (e.g., each meter) is separately assessed for conformance with the measurement accuracy requirements in section 95103(k).
Barrels of crude – other-than-thermal-EOR	95156(a)(8)	
Associated gas – thermal EOR	95156(a)(9)	
Associated gas – other-than-thermal-EOR	95156(a)(10)	
Dry gas produced	95156(b)	
Barrels natural gas liquids produced	95156(c)	The sum of (total) barrels of natural gas liquids produced is assessed for material misstatement (section 95131(b)(12)). Each measurement of individual natural gas liquid products is separately assessed for conformance with the measurement accuracy requirements in section 95103(k).
Volume of associated gas, waste gas, and natural gas processed (MMBtu)	95156(d)	The sum of (total) the volume of associated gas, waste gas, and natural gas processed (output or throughput expressed in MMBtu) is assessed for material misstatement (section 95131(b)(12)). Each measurement method/device is separately assessed for conformance with the measurement accuracy requirements in section 95103(k).
Cogeneration sources	95156(a)(3)(A)-(C)	Other production data are reviewed for conformance based on the verifier's assessment of uncertainty risk, but is not assessed for material misstatement or conformance with the measurement accuracy requirements. A reasonable estimate must be reported based on activity and production records.
Steam generator sources	95156(a)(4)(A)-(B)	
Steam used	95156(a)(6)	
Electricity generation sources	95156(a)(5)(A)-(B)	

2.2 Natural Gas Liquids Production and Natural Gas Processing

Natural Gas Liquids Production

The operator of 1) a natural gas liquid (NGL) fractionating facility, 2) a natural gas processing facility, or 3) an onshore petroleum and natural gas production facility with a natural gas processing plant that processes less than 25 MMscf per day that produces any of the natural gas liquids listed in MRR section 95156(c), must report these covered product data by clicking on the “NGL tab” located in the Subpart W spreadsheet. This tab is aggregated at the facility level (see Figure 3).

A1		Natural Gas Fractionating or Processing Facility - Additional Data Reporting				
A		B	C	D	E	
1 Natural Gas Fractionating or Processing Facility - Additional Data Reporting						
2						
3 Facility Name						
4						
5						
6 Source Category (covered product data)		Barrels corrected to 60 degrees fahrenheit				
7 Total		0.0				
8 Ethane						
9 Ethylene						
10 Propane						
11 Propylene						
12 Butane						
13 Butylene						
14 Isobutane						
15 Isobutylene						
16 Pentanes plus						
17 Natural Gasoline						
18 Liquified Petroleum Gas						
19 Bulk natural gas liquids not included in the preceding list						
20						
21 Note: A natural gas processing facility or an onshore petroleum and natural gas production facility with a natural gas processing plant that process less than 25 MMscf per day, or a natural gas liquid fractionating facility must use this NGL table to report NGL covered product data, as applicable (95156(c)).						
22						
23 An onshore natural gas processing facility that has an annual average throughput of 25 MMscf per day or greater should use the Onshore Production tab to report additional Natural Gas Processing covered product data, as applicable (95156(d)). These facilities must also use this NGL tab to report NGL covered product data pursuant to 95156(c).						
24						
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Figure 3. Cal e-GGRT reporting fields for NGL fractionators, natural gas processing facilities, and petroleum and natural gas production facilities with a natural gas processing plant with less than 25 MMscf per day throughput.

In some cases, onshore petroleum and natural gas production facilities may remove a variety of NGLs from produced gas and re-inject these NGLs into barrels of crude oil, which are then sold to refiners. Pursuant to section 95156(c), operators must report the amount of any re-injected NGLs as covered product data pursuant to sections 95156(a)(7) or (8) and not as NGL covered product data. All other natural gas liquids produced at the facility should be reported as covered product data pursuant to section 95156(c).

Further details on reporting NGL data can be found in the [Reporting and Verification Guidance for Natural Gas Fractionators](#).

Natural Gas Processing

Onshore natural gas processing facilities that have an annual average throughput of 25 MMscf per day or greater must also report the heat energy (in MMBtu) of associated gas, waste gas, and natural gas processed covered product data in the "Onshore Production tab" located in the Subpart W spreadsheet. Section 95156(d) specifies the appropriate method for reporting the annual HHV (MMBtu) of associated gas, waste gas and natural gas processed. Reporters should multiply the average HHV of the produced gas by the data year volume of produced gas to determine heat energy in MMBtu. Reporters must collect and average HHV measurements with the frequency requirements in section 95153(y)(2)(D). The amount of gas processed may be reported as either output or throughput of the gas processing facility, as long as the metering device used to quantify the data meets the accuracy requirements in section 95103(k) of MRR. In addition, onshore natural gas processing facilities that have an annual average throughput of 25 MMscf per day or greater must also report natural gas liquids covered product data in the "NGL tab" located in the Subpart W spreadsheet, pursuant to MRR section 95156(c). These reporting fields in the Cal e-GGRT tool are shown in Figure 1.

3 Additional Information

Detailed training materials for reporting using Cal e-GGRT:

<http://www.arb.ca.gov/cc/reporting/ghg-rep/tool/ghg-tool.htm>.

The GHG Mandatory Reporting Regulation, with full requirements:

<http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-regulation.htm>.

Contact the MRR helpdesk: ghgreport@arb.ca.gov.

Contact the MRR verification helpdesk: ghgverify@arb.ca.gov.

For help with reporting, please contact the appropriate staff member:

<http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-contacts.htm>.

For help with verification, please contact the appropriate staff member:

<http://www.arb.ca.gov/cc/reporting/ghg-ver/ghg-ver-contacts.htm>.